REMARKS/ARGUMENTS

Favorable reconsideration of this application as presently amended and in light of the following remarks is respectfully requested.

Claims 5, 10 and new Claims 20-29 are active in this application, Claims 5 and 10 having been amended, Claims 1-4, 6-9 and 11-19 canceled, and new Claims 20-29 added by the present amendment.

In the outstanding Office Action the Abstract of the Disclosure and Claim 15 were objected to as including informalities requiring correction; and Claims 1-19 were rejected under 35 USC §103(a) as being unpatentable over Kishi et al. (JP 2002-280642 A, and its JPO computer translation) in view of Hayashi, Kazuhiko et al. (U.S. Pat. Application Pub. No. 2002/0097540)[1]

.In response to the objection to the Abstract, a new Abstract correcting the noted informality has been submitted herewith. In response to the objection to Claim 15, Claim 15 has been canceled. Accordingly, the grounds for objection are believed to have been overcome and an indication to that effect is respectfully requested.

Applicants respectfully traverse the rejection on the merits, in view of the present amendment clarifying the claimed invention, and in view of Applicants' belief that the amended claims clearly patentably define over the cited prior art.

Briefly recapitulating, Applicants wish to point out that a magnetic memory and a magnetic head differ remarkably in the number and the size of magnetoresistance elements

[1] The PTO 1449 form accompanying the outstanding Official Action identifies the inventors of U.S. Patent 5,849,422 as having the name "Hayashi, Kazuhiko et al." However, the reference to "Hiyashi" at page 4, line 7 of the Official Action is clearly made with respect to U.S. Pat. Application Pub. No. 2002/0097540, and therefore this latter reference is considered the prior art on which the outstanding rejection is based, and not U.S. Patent 5,849,422.

included therein. In particular, a magnetic memory includes a large number of hyperfine magnetoresistance elements. Therefore, it is very important for a magnetic memory to achieve a weak switching magnetic field, as described at page 3, lines 1-24 of Applicants' specification.

Furthermore, in a spin valve-type magnetoresistance element whose free layer employs a structure in which a pair of ferromagnetic layers are placed one upon another with a nonmagnetic film interposed therebetween and the ferromagnetic layers form a weak ferromagnetic exchange coupling, it is possible to achieve a sufficiently weak switching magnetic field by increasing the thickness of the nonmagnetic film. However, this case presents a problem of a low magnetoresistance ratio as described at page 13, lines 2-12 of Applicants' specification. Therefore, a sufficiently weak switching magnetic field has been considered inconsistent with a high magnetoresistance ratio.

Amended Claim 5 recites that: "the nonmagnetic film is a layer selected from the group consisting of a first layer made of molybdenum and having a thickness of 0.8 nm to 1.2 nm, a second layer made of rhenium and having a thickness of 1.4 nm to 1.8 nm, a third layer made of tungsten and having a thickness of 0.8 nm to 1.2 nm, and a fourth layer made of niobium and having a thickness of 1.4 nm to 1.8 nm." Amended Claim 10 recites that: "the nonmagnetic film is a layer selected from the group consisting of a first layer made of silicon and having a thickness of 1.4 nm to 1.8 nm, a second layer made of germanium and having a thickness of 1.4 nm to 1.8 nm, a third layer made of $A1_2O_3$ and having a thickness of 1.0 nm, and a fourth layer made of AIN and having a thickness of 0.5 nm to 1.5 nm." As is thus evident, amended Claims 5 and 10 recite combinations of materials and thicknesses of a nonmagnetic film whereby both a high magnetoresistance ratio and a sufficiently weak switching magnetic field can be realized

according to Applicants' invention. In this way, the claimed invention defined by the subject matter of Claims 5 and 10 solves a magnetic memory problem by using a nonmagnetic film whose material and thickness are optimized as shown in Examples 1-8.

Kishi et al. discloses a magnetic memory in FIG. 11. While Kishi et al. mention Ru, Au, Ag and Cu as a material of a nonmagnetic film in paragraph [0050], Kishi et al. disclose that the thickness of the nonmagnetic film using such a material preferably falls within a range of 0.1 nm to 10 nm in paragraph [0077]. However, Kishi et al. do not disclose materials or the thicknesses of the nonmagnetic films recited in amended Claims 5 and 10, and accordingly, it is respectfully submitted that Claims 5 and 10 patentably define over Kishi et al.

Hayashi et al. on the other hand does not disclose a magnetic memory. As is evident from the description in paragraph [0002], Hayashi et al. relates to a magnetoresistance effect element for writing and reading an information signal on magnetic storage media. Thus, it is respectfully submitted that the Hayashi et al. disclosure has no relation to a magnetic memory. Hayashi et al. mention metal, oxide and nitride as a material of nonmagnetic layer 4 in FIG. 10, and Mo, W, Re, Nb, Si and the same as the metal in paragraph [0119]. Hayashi et al. also mention Mo, W, Re, Nb, Si and their compounds in paragraph [0229] as a material of nonmagnetic layer 13 in FIG. 64. However, Hayashi et al. do not disclose the thickness of nonmagnetic layer 4 in FIG. 10 or that of nonmagnetic layer 13 in FIG. 64. In addition, nonmagnetic layer 4 in FIG. 10 is adjacent to free layer 3b, but nonmagnetic layer 13 in FIG. 64 is away from free layer 3b. Accordingly, neither nonmagnetic layer 4 in FIG. 4 nor nonmagnetic layer 13 in FIG. 64 is a layer included in a free layer.

The outstanding Official action in regard to Claims 5 and 10, states:

> "Regarding claims 5, 10 and 18, the above Kishi/Hayashi/Kikitsu combination further discloses a magnetic memory (see for example Kishi, Fig. 11) comprising: a word line (for example, 41); a bit line (49) intersecting the word line; and a memory cell (47) positioned in an intersection portion of the word and bit lines (see Fig. 11) and including the magnetoresistance element according to claim 1.

However, the outstanding Official Action does not refer to the disclosure of Kikitsu et al. and does not identify any specific teaching relied upon. Thus, in view of the deficiencies of Kishi et al and Hayashi et al, it is not seen that the combination relied upon obviates the claimed invention.

On the contrary, Hayashi et al. has no relation to a magnetic memory, and accordingly, it is respectfully submitted that absent hindsight, it is impossible to combine Kishi et al. and Hayashi et al.

Further, the nonmagnetic layer disclosed in Hayashi et al. is not a layer included in a free layer. Therefore, a combination of Kishi et al. and Hayashi et al. only enables, for example, use of the nonmagnetic layer of Hayashi et al. as a nonmagnetic layer interposed between a free layer and a pinned layer included in the magnetic memory of Kishi et al. In addition, Kishi et al. and Hayashi et al. do not disclose the combinations of materials and thicknesses recited in amended Claims 5 and 10. Therefore, a combination of Kishi et al. and Hayashi et al. does not obviate the magnetic memory of amended Claims 5 and 10. Accordingly, the outstanding rejection on the merits is traversed.

Consequently, in view of the present amendment and in light of the above discussion,

Claims 5, 10 and 20-29 are believed to be in condition for allowance, and an early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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